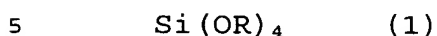


CLAIMS

1. A process for preparing a coating fluid containing a polysiloxane, which comprises forming a reaction mixture comprising a silicon compound (A) of the formula (1):



wherein R is a C_{1-5} alkyl group, a silicon compound (B) of the formula (2):



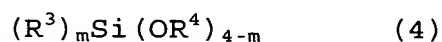
wherein R^1 is a C_{1-5} alkyl group, and n is an integer of
10 from 1 to 13, an alcohol (C) of the formula (3):



wherein R^2 is a hydrogen atom or a C_{1-12} alkyl group (the alkyl group may optionally be substituted by one or more substituents of the same or different types selected from
15 the group consisting of a C_{1-3} alkyl group, a C_{1-3} hydroxyalkyl group, a C_{2-6} alkoxyalkyl group, a C_{2-6} hydroxyalkoxyalkyl group and a C_{3-6} alkoxyalkoxyalkyl group), and oxalic acid (D), in a ratio of from 0.05 to 0.43 mol of the silicon compound (B) per mol of the
20 silicon compound (A), in a ratio of from 0.5 to 100 mol of the alcohol (C) per mol of the total alkoxy groups contained in the silicon compounds (A) and (B) and in a ratio of 0.2 to 2 mol of the oxalic acid (D) per mol of the total alkoxy groups contained in the silicon
25 compounds (A) and (B), and heating this reaction mixture at a temperature of from 50 to 180°C until the total amount of the silicon compounds (A) and (B) remaining in

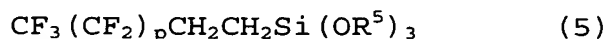
the reaction mixture becomes at most 5 mol%, while it is maintained at a SiO₂ concentration of from 0.5 to 10 wt% as calculated from silicon atoms in the reaction mixture and while absence of water is maintained.

- 5 2. The process for preparing a coating fluid according to Claim 1, wherein in the formation of the reaction mixture, a modifier (E) of the formula (4):



wherein R³ is a hydrogen atom, a C₁₋₁₂ alkyl group (the
10 alkyl group may optionally be substituted by one or more substituents selected from the group consisting of an amino group, a glycidoxy group, a methacryloxy group and a ureide group), a C₂₋₁₂ alkenyl group or a phenyl group, R⁴ is a C₁₋₅ alkyl group, and m is an integer of from 1 to
15 3, is further incorporated as a modifier (E) in a ratio of from 0.02 to 0.2 mol per mol of the silicon compound (A).

3. The process for preparing a coating fluid according to Claim 1 or 2, wherein in the formation of the reaction
20 mixture, a fluoroalkyl group-containing alkoxysilane (F) of the formula (5):



wherein R⁵ is a C₁₋₅ alkyl group, and p is an integer of from 0 to 12, is further incorporated as a fluoroalkyl
25 group-containing alkoxysilane (F) in such a ratio that the total amount of the silicon compound (B) and the fluoroalkyl group-containing alkoxysilane (F) is from

0.05 to 0.43 mol per mol of the silicon compound (A).

4. The process for preparing a coating fluid according to Claim 1, 2 or 3, wherein at least one sol selected from the group consisting of silica sol, alumina sol, 5 titania sol, zirconia sol, magnesium fluoride sol and ceria sol is further incorporated as an additive (G) to the coating fluid.

5. A process for forming a coating film, which comprises forming a reaction mixture comprising a silicon compound 10 (A) of the formula (1):



wherein R is a C₁₋₅ alkyl group, a silicon compound (B) of the formula (2):



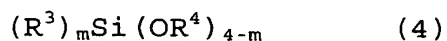
15 wherein R¹ is a C₁₋₅ alkyl group, and n is an integer of from 1 to 13, an alcohol (C) of the formula (3):



wherein R² is a hydrogen atom or a C₁₋₁₂ alkyl group (the alkyl group may optionally be substituted by one or more 20 substituents of the same or different types selected from the group consisting of a C₁₋₃ alkyl group, a C₁₋₃ hydroxyalkyl group, a C₂₋₆ alkoxyalkyl group, a C₂₋₆ hydroxyalkoxyalkyl group and a C₃₋₆ alkoxyalkoxyalkyl group), and oxalic acid (D), in a ratio of from 0.05 to 25 0.43 mol of the silicon compound (B) per mol of the silicon compound (A), in a ratio of from 0.5 to 100 mol of the alcohol (C) per mol of the total alkoxy groups

contained in the silicon compounds (A) and (B) and in a ratio of 0.2 to 2 mol of the oxalic acid (D) per mol of the total alkoxy groups contained in the silicon compounds (A) and (B); heating this reaction mixture at a temperature of from 50 to 180°C until the total amount of the silicon compounds (A) and (B) remaining in the reaction mixture becomes at most 5 mol%, while it is maintained at a SiO₂ concentration of from 0.5 to 10 wt% as calculated from silicon atoms in the reaction mixture and while absence of water is maintained, to form a solution of a polysiloxane thereby formed; then applying a coating fluid comprising the polysiloxane solution on a substrate surface to form a coating; and heat-curing the coating at a temperature of from 80 to 450°C, to form a coating film having a refractive index of from 1.28 to 1.38 and a contact angle with water of from 90° to 115°, as adhered to the substrate surface.

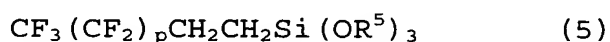
6. The process for forming a coating film according to Claim 5, wherein in the formation of the reaction mixture, a modifier (E) of the formula (4):



wherein R³ is a hydrogen atom, a C₁₋₁₂ alkyl group (the alkyl group may optionally be substituted by one or more substituents selected from the group consisting of an amino group, a glycidoxy group, a methacryloxy group and a ureide group), a C₂₋₁₂ alkenyl group or a phenyl group, R⁴ is a C₁₋₅ alkyl group, and m is an integer of from 1 to

3, is further incorporated as a modifier (E) in a ratio of from 0.02 to 0.2 mol per mol of the silicon compound (A).

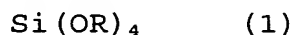
7. The process for preparing a coating film according to Claim 5 or 6, wherein in the formation of the reaction mixture, a fluoroalkyl group-containing alkoxy silane (F) of the formula (5):



wherein R^5 is a C_{1-5} alkyl group, and p is an integer of from 0 to 12, is further incorporated as a fluoroalkyl group-containing alkoxy silane (F) in such a ratio that the total amount of the silicon compound (B) and the fluoroalkyl group-containing alkoxy silane (F) is from 0.05 to 0.43 mol per mol of the silicon compound (A).

8. The process for forming a coating film according to Claim 5, 6 or 7, wherein at least one sol selected from the group consisting of silica sol, alumina sol, titania sol, zirconia sol, magnesium fluoride sol and ceria sol is further incorporated as an additive (G) to the coating fluid.

9. A coating film having a refractive index of from 1.28 to 1.38 and a contact angle with water of from 90° to 115° , which is formed as adhered to a substrate surface by forming a reaction mixture comprising a silicon compound (A) of the formula (1):

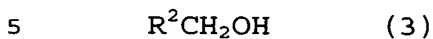


wherein R is a C_{1-5} alkyl group, a silicon compound (B) of

the formula (2):



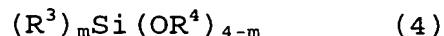
wherein R^1 is a C_{1-5} alkyl group, and n is an integer of from 1 to 13, an alcohol (C) of the formula (3):



wherein R^2 is a hydrogen atom or a C_{1-12} alkyl group (the alkyl group may optionally be substituted by one or more substituents of the same or different types selected from the group consisting of a C_{1-3} alkyl group, a C_{1-3} hydroxyalkyl group, a C_{2-6} alkoxyalkyl group, a C_{2-6} hydroxyalkoxyalkyl group and a C_{3-6} alkoxyalkoxyalkyl group), and oxalic acid (D), in a ratio of from 0.05 to 0.43 mol of the silicon compound (B) per mol of the silicon compound (A), in a ratio of from 0.5 to 100 mol of the alcohol (C) per mol of the total alkoxy groups contained in the silicon compounds (A) and (B) and in a ratio of 0.2 to 2 mol of the oxalic acid (D) per mol of the total alkoxy groups contained in the silicon compounds (A) and (B); heating this reaction mixture at a temperature of from 50 to 180°C until the total amount of the silicon compounds (A) and (B) remaining in the reaction mixture becomes at most 5 mol%, while it is maintained at a SiO_2 concentration of from 0.5 to 10 wt% as calculated from silicon atoms in the reaction mixture and while absence of water is maintained, to form a solution of a polysiloxane thereby formed; then applying a coating fluid comprising the polysiloxane solution on a

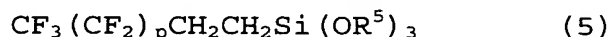
substrate surface to form a coating; and heat-curing the coating at a temperature of from 80 to 450°C.

10. The coating film according to Claim 9, wherein in the formation of the reaction mixture, a modifier (E) of the
5 formula (4):



wherein R^3 is a hydrogen atom, a C_{1-12} alkyl group (the alkyl group may optionally be substituted by one or more substituents selected from the group consisting of an
10 amino group, a glycidoxy group, a methacryloxy group and a ureide group), a C_{2-12} alkenyl group or a phenyl group, R^4 is a C_{1-5} alkyl group, and m is an integer of from 1 to 3, is further incorporated as a modifier (E) in a ratio of from 0.02 to 0.2 mol per mol of the silicon compound
15 (A).

11. The coating film according to Claim 9 or 10, wherein in the formation of the reaction mixture, a fluoroalkyl group-containing alkoxysilane (F) of the formula (5):



20 wherein R^5 is a C_{1-5} alkyl group, and p is an integer of from 0 to 12, is further incorporated as a fluoroalkyl group-containing alkoxysilane (F) in such a ratio that the total amount of the silicon compound (B) and the fluoroalkyl group-containing alkoxysilane (F) is from
25 0.05 to 0.43 mol per mol of the silicon compound (A).

12. The coating film according to Claim 9, 10 or 11, wherein at least one sol selected from the group

consisting of silica sol, alumina sol, titania sol, zirconia sol, magnesium fluoride sol and ceria sol is further incorporated as an additive (G) to the coating fluid.